REPORT

of the

COMMITTEE

to make a comprehensive study

of the

STEEL PLANTS

in the Public Sector

Report of the Committee to make a comprehensive study of steel plants in the Public Sector.

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Introduction

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RESEARCH

1 INTRODUCTION

52.1.1 In the process of applying science to achieve specified goals, technology is the tool or knowhow. Science is knowledge which is more or less universal, but the tool or technology is determined by the nature of the goal to be achieved. Depending on the latter as well as on the availability of resources there may be alternative technologies, the final choice of one among them being determined by feasibility, economics of operation and other socio-economic or even political considerations. One of the goals in agriculture is higher and more improved and diversified production. In order to achieve this a number of disciplines or sciences and diverse kinds of resources have to be deployed in a planned and systematic manner in the right channels. When a farmer finds in his possession the seed of a variety of, say, wheat having certain desirable characteristics, he hardly realises that this is the result of hard and sustained labour on the part of a band of scientists belonging to such diverse disciplines as genetics, plant breeding, plant physiology, agronomy, irrigation, soil chemistry, soil microbiology, entomology, pathology and a host of others. When a new and effective plant protection chemical makes its appearance in the market, the consumer is unlikely to be aware of the scrupulous search and studies that have gone into its making by a host of chemists, plant physiologists, agronomists, entomologists, pathologists and ecologists. If any other similar item of interest in

Limestone Mines at Nandini and the Head Office of Hindustan Steel Limited at Ranchi. It also availed itself of the opportunity at Ranchi to study the progress made by the Heavy Engineering Corporation. The Committee also interviewed a number of officers at these places. A list of officers who were interviewed by the committee is given at Annexure III.

4. The Committee wishes to place on record its appreciation of the cooperation received from the Plant Administrations and the Head Office of Hindustan Steel Ltd. and the Managing Director of Bokaro Steel Ltd. The committee is also thankful to the Department of Iron & Steel for making available their files and records whenever required.

5. The Committee is indebted to its Secretary, Shri A.N. Rajagopalan, for the able manner in which he assisted it in its deliberations and in the drafting of its report.

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more concrete shape, and the massive growth of science and technology in the country has been the result. The widespread influence which the various research organisations exert on the growth, direction and development of agriculture in general and of agricultural research in particular in the country demands that their activities and performance are carefully reviewed. The problems of management and administration of research have assumed new dimensions in the context of the rapid and extensive growth of science and technology commensurate with their applications in the varied fields of agriculture. The mobilisation of the scientific and technological resources of the country in the right direction requires fresh and objective thinking. These ideas and the issues raised above have been elaborated in this chapter.

7. M/s. Hindustan Construction Co. Ltd.	Rs. 2,01,29,115
8. M/s. Hind Constn. Co.	Rs. 2,02,97,507
9. M/s. G.C. Atwal & Co.	Rs. 2,99,54,494

2. As M/s. Dalmiya had not done this type of work, they were not considered further. Similarly M/s. Richardson & Cruddas were also dropped. M/s. Hindustan Construction Co. were dropped because they had recently received a large order for Bhilai. M/s. Hind Construction and M/s. Atwal were too high.

3. After discussion along with G.H.H. (the blast furnace suppliers, whose supply contract stipulated that they should approve of the civil engineering contractor and also supervise his work), M/s. Britannia stated that they would not be able to do this work and M/s. Patel were unable to take up the work before the monsoon. Thus, only M/s. Duggal and M/s. Gammon were left. The contract was awarded to M/s. Duggal as they were the lowest.

4. At the time of award of the contract to M/s. Duggal, the estimated cost was Rs.1,54,91,263.70, but ultimately the cost went up to Rs.2,06,06,500/-. One of the major contributory factors to this large increase was, apart from the additional items of work, the extra facilities given to M/s. Duggal, by payment for shuttering, and for hire of compressors, cranes etc. These could certainly have been avoided if a detailed estimate of the requirements had been prepared in advance. Apparently such an estimate was not prepared at that time due to lack of experience in this type of work. A redeeming feature seems to be that, even with these additional payments, the total paid to the

contractor.....5/-

contractor would be less than what it would have been if the next higher bid had originally been accepted.

5. The other large extra payment was for the importation of German carpenters, when at a somewhat late stage it became evident that the carpenters will not be able to tackle the intricate formwork unaided. This was a point which the Consultants should have spotted in time, in which event a few imported carpenter-foremen would be all that would have been necessary. The committee feels that skilled carpenters were even then indigenously available for this type of work and could have been recruited if action had been taken sufficiently early. It would appear that the project authorities got somewhat perturbed at a possible delay and hastened to import even the basic carpenter-labour.

6. It was also observed that considerable amounts had been spent on hiring of construction equipment. The Committee felt that the bulk of such construction equipment should have been assessed, procured and held available on the spot before starting construction. A suspense estimate for the purpose must be included in the Project Estimates. The equipment must be maintained and operated departmentally and must be led out on hire to contractors where necessary. The maintenance and servicing of such equipments should be the responsibility of the project and the contract with the contractor for the use of such equipments must be based on hire charges worked out in advance and on the basis of which the contractor must quote.

For the civil......6/-

7. For the civil engineering work for the rolling mills, tenders had been called on the basis of three different groups into which the work had been sub-divided. Five tenders were received from contractors in India, in addition to two quotations by cable from two British firms, viz. M/s. George Wimpey and M/s. Taylor Woodrow.

The five tenders were as follows:

Tenderer	Groups	Amount
1) M/s. Modern India Construction Co;, Calcutta.	II	Rs. 6,719,043
	III	Rs. 17,301,796
2) M/s. McKenzies Ltd., Bombay	III	Rs. 19,196,795
3) M/s. U.S. Duggal, New Delhi	III	Rs. 21,124,020
4) M/s. Britannia Building & Iron Co. Ltd., Calcutta.	I	Rs. 46,639,233
	II	Rs. 6,408,479
	III	Rs. 15,868,610
		Rs. 68,916,322
5) M/s. Patel Cementation, Calcutta.	I	Rs. 54,223,665
	II	Rs. 7,403,186
	III	Rs. 19,473,157
		Rs. 81,100,008

After negotiation, M/s. Wimpey were prepared for a "Target Price" plus fee basis and their tender was evaluated at Rs.81,073,087. M/s. Taylor Woodrow wanted actual cost plus fee of £400,000 (about Rs.5.3 million). Of the five tenders received, only M/s. Britannia Building & Iron Co. and M/s. Patel Cementation had quoted for all the groups. Of the two M/s. Britannia were lower at Rs.6.89 crores whereas M/s. Patel had quoted Rs.8.11 crores.

.M/s.../7

M/s. Britannia were considered not to have sufficient equipment to undertake the work. M/s. Patel had already taken a heavy contract for Durgapur. Although the tenders had been called for on the basis of 3 groups, it was later discovered that it would not be feasible to divide the work and it should be awarded to a single contractor, which would also be preferable from considerations of organisation and coordination of work. After negotiation, the contract was ultimately awarded to a combination of an Indian firm M/s. Gammon (India) Ltd. and a German one, M/s. Hechtief Ltd. more or less at the rate quoted by the highest tenderer. M/s. Hechtief, who were a member of the Civil Engineering Consultants, resigned therefrom on getting this contract.

8. The contract as awarded was for Rs.7.78 crores apart from "excluded items" of the value of about Rs.33 lakhs, as follows:

	(Rs. in crores)
a) Cost of material and labour (at target rates)	5.06
b) Supervision, hire charges of plant and equipment (target)	1.57
c) Fixed overheads and fees	1.15
Rs.	7.78

(a) & (b) above together form the "Target" figure of Rs.6.63 crores and any excess over or saving from this figure (after adjustments for increase in cost of labour or materials or increase in quantities), was to be shared between Hindustan Steel Limited, and the contractor in the ratio of 2 : 1. Provision

was.......8/-

was also made for payment of bonus if the work was completed ahead of schedule. The contract also provides for variation upto 10% of the Target Cost without affecting the fixed overheads and fees and variation beyond that would necessitate fresh negotiation for fixed overheads and fees.

9. As the work proceeded, it became clear that the quantities as estimated at the time of negotiating the contract were bound to be exceeded and the target cost would, therefore, go beyond the 10% limit provided for. With a view to keeping the value of this contract within the 10% limit, a threefold revision of the work allotment was done as follows:

i) certain portions of the work (column foundations) which had been part of the work as awarded in the contract were excluded therefrom and paid for separately;

ii) some other items of work were included in place of the above; and

iii) some other items which were to have been done by this contractor as part of the contract were taken out and got done by other contractors.

However, as it happened, in spite of all these adjustments, the 10% limit was in fact exceeded and the fixed overheads and fees also had to be re-negotiated. Against the estimate of Rs.7.78 crores at the time of award of contract, the final estimate of cost of civil engineering works of the Rourkela Rolling Mills comes to Rs.14.10 crores, which includes Rs.0.86 crores paid to agencies other than Hochtief Gammon.

The increase.....9/-

10. The increase is partly due to the value of "excluded" items: i.e. items which were contemplated in the contract but were not to form part of target and were to be paid for separately. These included construction of quarters for their staff, electricity and water supply, dewatering of foundations, demolition or clearing of sites, royalties, sales tax etc. and Force Majeure. But increase on this accounts only for Rs.1.71 crores. Of the remainder, the increase has been principally due to rise in quantities, particularly of concrete, which had risen from an estimate of 325,000 cbm at the time of the contract to about 450,000 cbm . an increase of over a third. The reason given was that the estimates at the time of the contract were based on rough drawings and detailed drawings were available only later. It is, however, observed that the main reason for the increase in quantities of concrete in because, while actually designing the foundations, extra quantities of earthwork in excavation and re-filling and foundation concrete had to be provided for. This was necessary as the entire area had to be filled to a depth of about 6 metres over the natural ground to come upto the required level. Additions and extensions were also found necessary.

11. It is clear, therefore, that at the time of award of contract, no proper survey of the land had been made. The Committee felt that a thorough study of the soil conditions and bearing capacity etc. should be done before a site is selected for a Plant and, in any case, must be completed before calling for tenders for civil engineering work. As far as possible, the

specifications given...10/-

specifications given at the time of tendering should be complete and changes of specification later should be avoided.

12. In this case, it will be seen that although it was the idea originally to award the tenders groupwise, it was later decided to award the tender to a single contractor. Ultimately, however, the work was, in fact, completed by more than one contractor. The Committee feels that there was not enough justification to give up the original idea of groupwise tender. In fact, it would enable a larger number of contractors to participate in tendering, thus encouraging greater competition, if the scope of each item of work was reasonably small. It would also enable the Department itself to step in and take over the work, if the progress in any particular item was not quite satisfactory. The possibility of doing all civil engineering work departmentally is dealt with in greater detail later on in the Report (Chapter III).

CHAPTER II

Increase in cost of Power Plant at Rourkela

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One of the terms of reference of the Committee is to examine the increase in estimates of the cost of the Power Plant at Rourkela. Commenting on this increase in their thirty-third Report, the Estimates Committee have drawn attention to the increase of about Rs.2 crores (from Rs.6.72 crores to Rs.8.62 crores) in this case. The estimate of Rs.6.72 crores was arrived at while preparing the Project Report (1955) and by the time the tender was awarded (October, 1956), the prices had already gone up by about 15% mainly due to rise in wages in West Germany. The estimated cost at the time of award of tender was Rs.7.66 crores.

2. There is, however, still an increase of about Rs.1.22 crores from this estimate. There has been an increase of about Rs.0.54 crores under F.O.B. Plant and Equipment and about Rs.1 crore under erection with slight reductions under civil engineering works. The increase under FOB has been explained by the Project as being due to (i) transfer of Turbo-blowers from the "Blast Furnace" Head to the "Power Station" Head - Rs.40 lakhs and (ii) Additional 33 KV, 6.6 KV switch gear and cabling - Rs.27.8 lakhs.

3. The increase of about Rs.1 crore under erection was explained as being due to:

(a) increase in scope of supplies under F.O.B.,

(b) increase in expenditure on foreign Technicians; and

(c) increase in period of employment o
foreign Technicians, due to delay
in erection on account of various
reasons.

4. While two-thirds of the increase in the F.O.B. Cost is only a transfer from another head of account, there has still been a substantial increase due to additions after award of tenders and also due to under estimation of erection charges under Indian conditions. As power plants of this capacity have been erected in India before, the Consultants should have been able to make a more reliable estimate. The Committee also noticed that one of the main specifications in the Tender, namely the capacity to meet extreme load swings, was changed during negotiations with the suppliers in West Germany. While the tender specifications insisted on 28 MW in 4 seconds, the plant as finally accepted was only capable of 19.5 MW in 4 seconds and 30 MW in 10 seconds. None of the tenderers had offered plant complying with the original specification. The alteration was presumably done when it was realised that an over-rigid specification had been indicated and plant conforming to such a specification was not obtainable. The Committee feels that prescribing unnecessarily stringent specifications at the time of going out for tender may have the effect of restricting competition apart from the fact that the introduction of such changes at the stage of negotiations with selected suppliers may give them opportunities to seek higher

..... prices.

prices. The Committee, therefore, recommends that before finalising the specifications for tender, due care should be taken to ensure that the specifications are, in fact, those which are necessary and essential and that the suppliers would be in a position to meet the prescribed specifications.

5. The Committee also noticed that in this case, the lowest tenderer had also offered plant to the revised specification and the tender committee had recommended this offer as acceptable. There is no record why this lowest tender was rejected and subsequent negotiations in West Germany were conducted with another tenderer; nor were officials whom the Committee was able to examine in a position to indicate why this passing over was decided upon. A precise indication in writing of the reasons for ignoring the lowest tender should have been given by the deciding authority for future guidance.

6. The Committee also observed that for the 1.8 million ton expansion of the Rourkela Steel Plant, tenders were invited on a limited basis for the extension to the power plant. Here too the project authorities omitted to issue the tender notice to the tenderer who was lowest on the earlier occasion. No reasons have been recorded.

CHAPTER III

Civil Engineering Work for future Steel Plants.

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In the course of its study of the various civil engineering contracts for the first phase of the three Public Sector Steel Projects, the Committee came across several instances where the estimated cost of the work had gone on rising either because the various complex items of work involved were not understood by the contractor at the time of award of tender or because they were not spelt out in detail in the contract itself. The result had been that in a number of cases "extras" had to be paid, extra facilities had to be provided to the contractor etc., all of which had contributed to the rise in cost. The quantum of "overheads" allowed in the Hochtief Gammon contract struck the Committee as being an unduly high percentage of the nett cost of the work, as derived after excluding the cost of steel and cement which were supplied by Hindustan Steel Limited and which formed more than 50% of the gross value of the contract. The rates quoted in the case of "turn-key" jobs are even higher. For instance, for the expansion work at Durgapur, it was understood from the Project that the rate for concreting (which is a representative item and forms a large part of the civil engineering work) works out at an average of Rs.547/- per cbm in the case of "turn-key" jobs, whereas the rate works out to an average of Rs.288/- only per cbm

....in the case

in the case of "non turn-key" jobs - i.e. where the work is done through a civil engineering contractor engaged by the Project itself, instead of through the equipment supplier. Even allowing about 40% for Drawing Office charges, establishment for coordination, unforeseen items of work such as re-alighment of cables, trestles etc. and insurance for possible increase in quantities, the disparity in rates is quite substantial, and can conservatively be set at not less than Rs.100 cbm.

Thus the cost increase on the volume of "turn-key" jobs in this instance alone is about Rs.65 lakhs (for about 65,000 cbm). The Committee feels that for a fraction of this amount, a departmental civil engineering establishment of considerable magnitude could have been maintained for a long period.

2. The Committee, therefore, feels that particularly in view of the difficulty in laying down precise specification of work and delineation of responsibility in civil engineering work in such a complex project as a steel plant, it would be advisable to undertake the construction of such work departmentally. The construction team, consisting of Chief Engineers, who would be directly responsible for the construction of different sections of the Project, must be selected and associated with the project even at the Planning stage. These engineers should be responsible for the construction of the particular section entrusted to them. The civil engineering organisation

.... may be on the

may be on the lines adopted by irrigation projects, e.g. Bhakra. The civil engineering work of a million tonne steel plant is itself of sufficient magnitude to require the full time of a construction organisation of this kind. The Committee noted that in Bhilai the departmental civil engineering organisation is already handling such intricate jobs such as laying of conduits, foundation bolts etc. in mass concrete work, leaving only the actual concreting to be done by outside contractors. It would be preferable to do this latter portion also departmentally.

3. Another reason why the civil engineering estimates proved to be wide off the mark was because the schedule of rates adopted for purposes of initial estimating was based on rates for ordinary Public Works Department types of work and not specifically evaluated with particular reference to the highly specialised and complex types of work involved in the construction of a Steel Plant. This is quite understandable as, at the time the construction of the first phase was undertaken, enough data might not have been available nor were the people concerned experienced in this type of work. However, during the course of their discussions at Bhilai, the Committee learnt that they had now prepared a detailed schedule of rates for purposes of expansion. The Committee recommends that every project before commencement of work should first compile a schedule of rates in sufficient detail, analogous to the Bhilai one, adapted to local conditions, and proper estimates for each

.... item of work

item of work should be prepared on the basis of such schedule of rates.

4. The Committee also understands that there is a great shortage of fabrication capacity in the country which creates bottle-necks from time to time. Further, as all these fabricators are at present located mainly in the Calcutta and Bombay regions, the structurals have to go there from the steel plants and then be transported back to the site of the new steel plant. It may be of advantage if a fabrication shop, to be part of the construction organisation referred to in the previous paragraph, is set up either near one of the steel plants, or near Bokaro, which could serve the needs of Bokaro and other future steel plants. The Committee understood that there was such a proposal to have a fabrication shop near Durgapur but it was later on given up. The relevant papers were, however, not readily available for study. It is understood that Bhilai has already got the nucleus of such a shop which is doing part of the work for the expansion. As Bhilai is also centrally situated and produces Heavy Structurals, the Committee recommends that this fabrication shop should be suitably strengthened and should become part of the construction organisation to specialise in the fabrication of steel plant structures.

5. In Bhilai, as well as in the Heavy Engineering Corporation at Ranchi, the Committee was happy to note that, in several structures, stanchions of prestressed concrete were being used in the place of steel ones. This would certainly lead to saving

....in steel and

in steel and may be resorted to, to the extent possible, keeping in view the load to be carried. For this purpose, the Committee recommends that facilities for manufacturing prestressed concrete stanchions etc. may be established at the site of the new steel plant.

6. As has already been indicated in paragraph 1 above, "turn-key" jobs are unduly costly. Further, in such jobs, the Project Engineers do not have much chance to achieve the necessary expertise. A view was expressed that the main reason for going in for "turn-key" jobs was the need for speedy execution and that the drawings are not supplied quickly enough in the case of "non turn-key" jobs. This does not sound a convincing reason, as the civil engineering sub-contractor of the suppliers themselves will also have to get the same drawings. The contract with equipment suppliers should be therefore, specifically provide for the timely supply of drawings. The Committee do not favour "turn-key" contracts.

CHAPTER IV

Training Arrangements

A high standard of technical skill is essential for efficient management of modern steel plants. In the context of acute shortage of skilled technicians the question of training of technical personnel assumes great importance and for this purpose adequately staffed and equipped training centres are necessary. Also, it is essential that training facilities should keep pace with the building of new steel plants and expansion of the existing ones.

2. It was estimated that the three public sector plants, which were to be commissioned almost simultaneously, would require 2,000 engineers and 19,000 operatives. Such a large number of technicians could obviously not be trained in the 2 private sector steel plants which had themselves to cater for their own expansion programmes. The offer of U.S.S.R., U.S.A. and U.K. for training of Indian engineers was, therefore, readily accepted. In the USSR 400 engineers and 350 operatives, in USA about 600 engineers and in the U.K. about 300 engineers were trained. In addition, a large number of operatives were trained in engineering firms and institutes in India.

3. Rourkela Steel Plant: The Committee was informed that a Technical Institute at Rourkela was established in May 1959 with a batch of 100 trainees and within a year, it had on its rolls 564 trainees. It was understood that the Institute

has so far trained as many as 2305 trainees in various categories. (Engineers 428, Senior Operatives 483, Junior Operatives and Artisans 1394).

4. This institute trains graduates in mechanical, electrical, metallurgical and chemical engineering. Training is also imparted to senior and junior operatives and artisans. The period of training for technical graduates is 2 years and for senior and junior operatives 1½ years.

5. The pay scales of graduate engineers and apprentices correspond to those allowed to Class I Technical Officers in the various Government Departments who are recruited through Union Public Service Commission.

6. Several publications, such as Operation Manuals, Training Guides, pamphlets etc. have been brought out by the Institute which should be of great help to the trainees. Also very good facilities exist for theoretical and practical training.

7. The Committee was impressed with the progress of this Technical Institute, which can serve as a model for other steel plants and industries in the country.

8. Bhilai: The Bhilai Technical Institute started functioning in June, 1959 and now has good facilities for theoretical and practical training. Like Rourkela, training courses are provided for graduate engineers (2 years), senior & junior operatives (1½ years) and artisans (1½ years). It has trained upto date 2556 trainees in various categories (engineers 422,

....senior and

senior and junior operatives 907 and artisans 1227).

9. Durgapur: The Committee was told that no technical institute was established in this plant and engineers, operatives and artisans required were trained at Rourkela, and Bhilai. It was understood however, that such an institute was now under construction.

10. The Committee feels that a technical institute should have been built at Durgapur at the same time as those established at Rourkela and Bhilai as the number of technicians required was so large that a third institute was fully justified. Besides, in-plant training on the machinery and plant, on which the trainees are to be employed later, assures requisite skill and workmanship. As recruitment of the majority of artisan class of operatives is bound to be local, a training institute for each prospective steel plant becomes necessary.

11. The Committee is of the view that all steel plants to be built in future should have their own well equipped Technical Institute and the basic training courses should be started well before the scheduled commissioning of the plants, as it takes a minimum of two years to train engineers and operatives. This will ensure that when the plants are ready for commissioning sufficient number of engineers and operatives would be available to man them.

12. In order to curtail the in-plant training of Graduate Engineers, the Hindustan Steel Limited have devised a scheme of recruiting undergraduates from Engineering Institutions after they have completed three years of the five year integrated course. In the

........two following

following vacations, these stipendiaries are given in-plant training and in the two academic years are given a specialised course in steel plant engineering and technology in one of the Indian Institutes of Technology. Thereafter they will proceed to obtain their Engineering Degree. They will be simultaneously recruited as engineer trainees in the steel plants and undergo a further short period of plant training in lieu of the two year training which is now being given to Graduate Engineers. This scheme effectively curtails the overall period of training and the Committee recommends its continuance. A note on this scheme obtained by the Committee from the Hindustan Steel Limited is reproduced as ANNEXURE IV .

CHAPTER V

General recommendations for future steel plants

Several types of locomotives and rolling stock are in use in Rourkela, Bhilai and Durgapur Plants. At Bhilai, 6 types of couplers are fitted in the rolling stock which results in difficulties and loss of time during shunting operations. The match cars and pocket couplers are used to work rakes comprising vehicles with different types of coupling gear. The adoption of one type of coupler for locomotives and wagons would expedite movements. Steel plants could perhaps profit from association with the Research Design & Standards Organisation of Indian Railways in tackling the problem of standardisation of locomotives and wagons. Also, substantial economies would be possible from standardisation both in manufacture and maintenance during the service life of the rolling stock.

2. The ladle chassis and ingot bogies which are peculiar to steel plants are at present imported. Steps should be taken to develop indigenous manufacture if this has not already received attention.

3. The Central Repair Shop at Bhilai is well equipped for the manufacture of a large variety of spare parts needed for efficient maintenance. Also each Department has its own repair shop to deal with day-to-day maintenance requirements and emergencies. This is a very good feature for ensuring smooth working and may with advantage be copied by other steel plants to the extent necessary.

.... With the

4. With the Russian offer to build the 1.5 million ton stage of the Bokaro Project, it is certain that the capacity of the Ranchi Heavy Engineering complex will be utilised to the fullest extent. Advantage should be taken of this decision to standardize a number of Steel Plant equipments like overhead cranes, conveyor and feeder systems, so that not only Bokaro, but also the newer Steel Plants contemplated are ensured of a supply of standardised components and spares after initial installation of equipment. The same should apply to electric motors where apart from production in the Heavy Electricals, the capacity of the Private Sector could also be utilised. The stocking of spares for all this equipment could be reduced to a minimum if standardisation is such that equipment installed in the newer steel plants is interchangable with the corresponding equipments in one or other of the existing steel plants.

5. The permanent way and traffic staff in steel plants should receive training on the adjoining railways to acquaint themselves with transportation and track laying and maintenance problems.

6. The line space at unloading and loading points seems to be limited in some cases. It was understood that at the Sintering Plant Bunker at Bhilai only 2½ BOBX wagons carrying limestone can be placed at a time; daily intake of such wagons being 24. The process of piecemeal placing and manual release is time consuming. The line capacity under the cranes in the Billet Mill and the Merchant Mill is 6 BOX wagons at a time. Movements have to take place in terms of rake loads of 20 BOX wagons. More

....liberal

liberal provision of loading and unloading space would expedite movements and reduce the demurrage bill..

7. A total of 750 technical personnel has been sanctioned for the Central Engineering and Design Bureau but only 500 are in position. Around 40,000 drawings have to be prepared for a million-ton plant and around 60,000 drawings for a 2-million plant. The committee hopes that the progress of this Bureau would not be held up for want of engineers and Draughtsmen and not only the vacancies would be filled up as they arise but also effective steps would be takento meet further requirements.
The committee learnt that the Central Engineering and Design Bureau is obliged to purchase certain drawings from abroad, e.g. Hochtief on account of lack of personnel. Interlocking of the design section of Bhilai with the Central Engineering & Design Bureau at Ranchi would, the Committee feels, be an advantage in which case it would function in the same manner as the Central Engineering and Design Bureau's branch establishments at Rourkela and Durgapur.

SUMMARY OF CONCLUSIONS & RECOMMENDATIONS:

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i) The bulk of all construction equipment should be assessed, procured and held available on the spot before starting construction.

ii) A thorough study of the soil conditions and bearing capacity etc. should be done before a site is selected for a plant and, in any case, must be completed before calling for tenders for civil engineering work.

iii) Before finalising the specifications for tender for plant and equipment, due care should be t akento ensure that the specifications are, in fact, those which are necessary and essential and that the suppliers would be in a position to meet the prescribed specifications.

iv) In view of the difficulties in laying down precise specification of work and delineation of responsibility in civil engineering work in such a complex project as a steel plant, it would be advisable to undertake the construction of such work departmentally.

v) Every project, before commencement of work, should first compile the schedule of rates in sufficient detail, analogous to the Bhilai one, adapted to the local conditions and proper estimates for each item of work should be prepared on the basis of such schedule of rates.

vi) The Fabrication Shop at Bhilai should be suitably strengthened and should become part of the construction organisation, to specialise in the fabrication of steel plant structures.

vii) Facilities for manufacturing pre-stressed concrete stanchions etc. may be established at the site of the new steel plant.

viii) A training institute for each steel plant becomes necessary, as recruitment of the majority of artisan class of operatives is bound to be local.

ix) The scheme devised by Hindustan Steel Limited for recruiting under-graduates from Engineering Institutions and to give them In-Plant training effectively curtails overall period of training and its continuance is recommended.

x) Standardisation of equipment in use inside a steel plant, e.g. couplers of rolling stock as well as standardisation of similar type of equipment in different plants, such as cranes, motors etc. would ensure ease of operation and at the same time solve to a great extent the problem of spare parts.

........27/-

xi) Strengthening of the Central Engineering and Design Bureay and interlocking of the Design Section of Bhilai with that Bureau at Ranchi is desirable.

Sd/-
(S. Ratnam)
Chairman.

Sd/-
(A.N. Rajagopalan)
Secretary

Sd/-
(B.S. Sindhu)
Member

Sd/-
(U. Ananda Rao)
Member

ANNEXURE I

(TO BE PUBLISHED IN THE GAZETTE OF INDIA EXTRAORDINARY
PART I SECTION I ON THE 23rd JULY, 1963).

GOVERNMENT OF INDIA
MINISTRY OF STEEL & HEAVY INDUSTRIES
(DEPTT. OF IRON & STEEL)

New Delhi, the 22nd July, 1963

RESOLUTION

No.Parl.(7)-4/62. The Government of India have decided to constitute a Committee, to make a comprehensive study of the steel plants in the Public Sector, consisting of:

1. Shri S. Ratnam	Chairman
2. Shri B.S. Sindhu	Member
3. Shri Ananda Rau	Member

Shri C.A. Nair will act as Secretary to the Committee.

2. The terms of reference of the Committee will be as follows:-

i) Study the problems connected with the setting up of the first phase of the three Steelworks of Hindustan Steel Limited in the public sector viz., the one million ton plants at Bhilai, Rourkela and Durgapur, with particular reference to the agreements with Consultants, project reports, contracts, and arrangements made for training of personnel, The principal object of the study will be to draw lessons from the past with a view to suggest measures for avoiding similar difficulties in future

ii) Examine in particular the contracts for civil engineering work of the blast furnaces and rolling mills at Rourkela, and more generally the other contracts entered into by the Hindustan Steel Ltd. in the past.

iii) Examine the increase in estimates of the cost of the power plant at Rourkela.

3. The committee is requested to submit its report to the Government before 31st December, 1963.

ORDER

Ordered that this may be published in the Gazette of India Extraordinary for general information.

Sd/-

(N.N. Wanchoo)
Secretary to the Government of India.

ANNEXURE II

(TO BE PUBLISHED IN THE GAZETTE OF INDIA EXTRAORDINARY)
PART I SECTION I ON THE 21ST NOVEMBER, 1963)

GOVERNMENT OF INDIA
MINISTRY OF STEEL, MINES & HEAVY ENGINEERING
(DEPARTMENT OF IRON & STEEL)

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New Delhi, the 21st November, 1963.

RESOLUTION

No.PARL(7)-4/62. It has been decided to make the following change in Resolution No.PARL(7)-4/62, dated the 22nd July, 1963:-

'Shri A.N. Rajagopalan, Under Secretary, Department of Iron & Steel, will act as Secretary to the Committee in place of Shri C.A. Nair from the date of this Resolution.'

ORDER

Ordered that this may be published in the Gazette of India Extraordinary for general information.

Sd/-
(N.N. Wanchoo)
Secretary to the Government of India.

ANNEXURE III

List of Officers interviewed by the Committee.

1. Shri A.N. Banerji, General Manager, Rourkela Steel Project.
2. Dr. G. Drath, General Superintendent, Rourkela Steel Project.
3. Shri B. Appu Rao, General Superintendent, Rourkela Steel Project.
4. Shri B. Gopal Rao, Chief Electrical Engineering, Rourkela Steel Project.
5. Shri Rama Iyengar, Dy. Chief Engineer(Construction),Rourkela Steel Plant.
6. Shri R.D. Patnaik, Controller of Stores & Purchase, Rourkela Steel Plant.
7. Shri C.R. Krishnamurthi, FA&CAO, Rourkela Steel Project.
8. Shri K.N. Venkateswer, Dy. Traffic Manager, Rourkela Steel Project.
9. Shri Inderjit Singh, General Manager, Bhilai Steel Project.
10. Shri Purtej Singh, Chief Engineer (Construction) Bhilai Steel Project.
11. Shri M.S. Lal, Dy. Chief Engineer(Construction) Bhilai Steel Project.
12. Shri R. Sambasivan, Dy. Chief Engineer, Bhilai Steel Project.
13. Shri K.S. Sitaramiah, Dy. Chief Engineer, Bhilai Steel Project.
14. Shri T.S. Krishnamurthy, Chief Electrical Engineer, Bhilai Steel Project.
15. Shri M.K. Mehta, Chief Design & Planning Engineer, Bhilai Steel Project.
16. Shri D.J. Bell, General Manager, Durgapur Steel Project.
17. Shri M.J. Bhatt, Chief Engineer, Durgapur Steel Project.
18. Shri B. Murao, FA&CAO, Durgapur Steel Project.
19. Shri P.P. Dani, Adviser, Hindustan Steel Ltd., Ranchi.
20. Shri Suku Sen, Adviser, Hindustan Steel Ltd., Ranchi.
21. Shri R.P. Sinha, Chief Engineer (Designs), Hindustan Steel Ltd.,Ranchi.
22. Shri K.M. George, Managing Director, Bokaro Steel Ltd.

ANNEXURE IV

A BRIEF NOTE ON THE PAID IN-PLANT TRAINING IN GOVERNMENT STEEL PLANTS FOR STUDENT ENGINEERS.

The Scheme of In-Plant Training for students still studying for their degree in engineering was sponsored jointly by Hindustan Steel Ltd. and Bokaro Steel Ltd. in consultation with the Government and the Institute of Applied Manpower Research. The main objectives of the scheme are:

(i) To catch young student engineers and create in them an interest in the steel industry.

(ii) To reduce the period of training which we have to impart to the graduate engineers recruited by us from amongst candidates who have completed their B.E. Degree. At present, all such candidates are trained by us for a period of two years. In other words, they are available for doing the actual job only after the expirty of two years or more after passing the B.E. Examination, depending on the date when they join us. This In-Plant training during the Summer vacations arranged under the new scheme is expected to effectively reduce the period of training after graduation, not only due to actual training which they will have during the period of about sixteen weeks in all in our steel plants but also on account of better understanding and appreciation of the subject during the last two years of their term of B.E. Course which this "induction" is bound to generate. The total period of training will be reduced by a year.

In order to select the candidates for the training, an advertisement was issued by us in the month of March, 1964. Simultaneously, the copies of the advertisement and other relevant details of the scheme and application forms etc. were sent to the different engineering Institutions in the country, requesting them to give due publicity of the scheme among the students who were required to apply through their Institutional Heads. The response was very good. We received more than 1,700 applications. Keeping in view the requirements of Hindustan Steel Ltd. and Bokaro Steel Ltd. in 1967, we selected 261 candidates for this training. The selection of candidates was made on the basis of their performance in the engineering examinations held so far. Offers were sent to 261 candidates (in Mechanical, Electrical, Metallurgical and Chemical Branches) selected on this basis and the candidates were asked to report for training at Durgapur, Bhilai and Rourkela Steel Plants on the 11th May 1964. 167 candidates reported for training. Many of the candidates could not report for training as their current examinations were being held. In view of the fact that training programme had commenced on the 11th May and was to end on the 4th July, it was not considered desirable to extend the date of joining beyond the 18th May, 1964:

...2/-

Name of Plant	Joined				TOTAL
	Elec.	Mech.	Met.	Chem.	
Bhilai Steel Plant	7	31	19	3	60
Durgapur Steel Plant	14	30	19	2	65
Rourkela Steel Plant	13	15	9	5	42
	34	76	47	10	167

TRAINING: The training which commenced on the 11th May was to continue upto the 4th July, 1964, i.e. for a period of approximately 7½ weeks. The training programme has been arranged in such a way that trainees are acquainted with the working of certain departments in the current year, and with the rest of the departments during the next year. The training is to consist of "Induction training" seeking to acquaint the candidates with the working of the whole plants as such as also of specialised training relating to the subject of the study of the trainee in the B.E. Course. Broadly speaking, the intention is that during the first year of the training Metallurgical & Chemical student engineers would be given a thorough grounding in metallurgical processes. Electrical and Mechanical engineers would be given training in engineering activities. During the second year of training, this would be reversed for these groups. In essence, during the first year, they try to understand their own specialised activities and in the second year, they understand related activities.

A complete stage by stage assessment of the trainees' progress shall be made during the training period. This assessment shall be available in cards in order that it can be transferred to any other plant. It is proposed that the trainees shall receive training during the second year in a plant different from the one in which he received during the current year.

We have now written to the Universities and Engineering Institutions to hold their examinations and close their colleges for summer in such a way that the students selected are free to take up the In-Plant training in the first week of May and continue their training upto the first week of July.
